

WEST BRANCH DAM  
CT 00101

NAUGATUCK RIVER BASIN  
TORRINGTON, CONNECTICUT

The original hardcopy version of this report  
contains color photographs and/or drawings.  
For additional information on this report  
please email

U.S. Army Corps of Engineers  
New England District  
Email: Library@nae02.usace.army.mil

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00101	2. GOVT ACCESSION NO. ADA143140	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) West Branch Dam Naugatuck River Basin, Torrington, Conn. NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE June 1980
		13. NUMBER OF PAGES 40
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, West Branch Dam Naugatuck River Basin Torrington, Conn.		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The West Branch Dam has a tributary watershed of 33.3 square miles. The pond has a water surface area of 5.5 acres and a storage capacity with the water level at the crest of the dam of 72 acre-feet. The spillway consists of 107 ft. long concrete egg section with 8 ft. of freeboard. In addition, an intake chamber with two 42 inch sluice gates discharges to a canal which can divert water back to the river channel over a 34 ft. concrete spillway. The main spillway has a capacity of about 8,200 cfs before overtopping the right portion of the dam. The West Branch Dam is classified as "Small" in size because of its 72 acre-feet of storage capacity.		

**ROALD HAESTAD, INC.**  
CONSULTING ENGINEERS

37 Brookside Road • Waterbury, Conn. 06708 • Tel. 203 753-9800

June 13, 1980

The Department of the Army  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Attention: E. P. Gould  
Project Management Division

Re: West Branch Dam a/k/a Church Street Dam  
Torrington, Connecticut

Gentlemen:

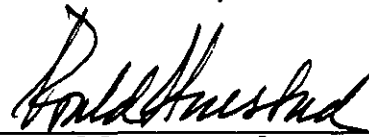
Following field surveys and a dam failure analysis of West Branch Dam (a/k/a Church Street Dam), we conclude that the dam should be reclassified as having a low hazard potential.

We are enclosing a brief letter report substantiating our findings.



Very truly yours,  
ROALD HAESTAD, INC.

By

  
Roald Haestad

RH:cft  
Encl.

## EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

The West Branch Dam has a tributary watershed of 33.3 square miles. The pond has a water surface area of 5.5 acres and a storage capacity with the water level at the crest of the dam of 72 Acre-Feet.

The spillway consists of a 107 foot long concrete ogee section with 8 feet of freeboard. In addition, an intake chamber with two 42-inch sluice gates discharges to a canal which can divert water back to the river channel over a 34 foot concrete spillway. The main spillway has a capacity of about 8,200 cfs before overtopping the right portion of the dam.

In accordance with the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the West Branch Dam is classified as "Small" in size because of its 72 Acre-Feet of storage capacity. The dam's height of 22 feet is below the minimum requirement of 25 feet for a "Small" dam.

The dam overtopped and failed during the August 1955 Flood, washing out the embankment to the left of the spillway. This section was rebuilt in 1956 as an earth embankment with a concrete core wall. Since then, the Hall Meadow Brook Flood Control Dam has been constructed on the upstream watershed.

Plans for the original dam and for the 1956 reconstruction are available, but no design computations were found.

A dam breach analysis was made using the Corps of Engineers' "Rule of Thumb" guidance for estimating downstream dam failure hydrographs. Failure was assumed with the water level at the top of the dam. Full spillway flow was assumed to continue after the

## DESCRIPTION

WEST BRANCH DAM A/K/A CHURCH STREET DAM  
CT 00101  
TOWN OF TORRINGTON, COUNTY OF LITCHFIELD  
ON THE WEST BRANCH OF THE NAUGATUCK RIVER  
OWNED BY: LAND TRUST, J. ERIC CHADWICK, TRUSTEE

The West Branch Dam consists of, from right to left, a 100 foot long earth embankment with an intake structure to a downstream canal, a 107 foot long concrete ogee section, and a 160 foot long earth embankment with a concrete core wall. The intake structure to the downstream canal contains two 42-inch sluice gates which discharge to the canal. The canal is separated from the river channel by an earth embankment which contains a 34 foot long auxiliary spillway. This spillway discharges into the river downstream of the dam. In the past, water from the canal would flow through a 36-inch reinforced concrete pipe (RCP) to a downstream manufacturing plant. The low level outlet, or blow-off, consists of a 48-inch RCP located to the left of the main spillway section and is controlled by a manually operated sluice gate. The dam has an overall length of 370 feet and a maximum height of 22 feet.

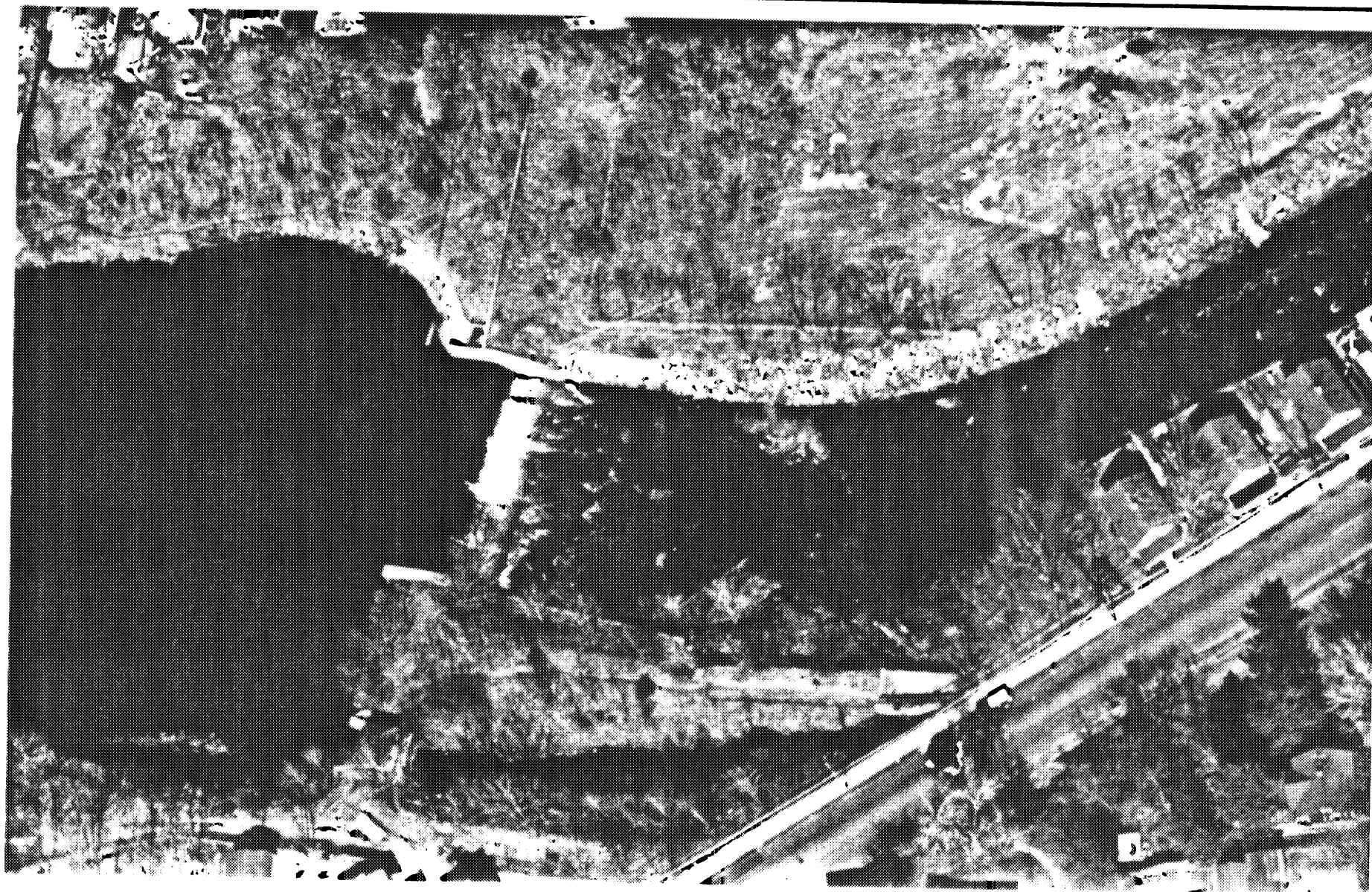
The dam overtopped and failed during the August 1955 flood and washed out the earth embankment to the left of the main spillway section. This section was rebuilt in 1956 as an earth embankment with a concrete core wall.

The dam is owned by Land Trust and presently serves no useful purpose to them.

The dam appears to be in fair condition and requires some work.

## TABLE OF CONTENTS

	<u>PAGE</u>
DESCRIPTION	1
EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES	2 - 3
OVERVIEW PHOTO	4
LOCATION PLAN	5
APPENDIX A	A1 - A2
APPENDIX B	B1 - B2
APPENDIX C	C1 - C15
APPENDIX D	



OVERVIEW PHOTO

U.S. ARMY ENGINEER DIV. NEW ENGLAND  
CORPS OF ENGINEERS  
WALTHAM, MASSACHUSETTS

ROALD HAESTAD, INC.  
CONSULTING ENGINEERS  
WATERBURY, CONNECTICUT

NATIONAL PROGRAM OF  
INSPECTION OF  
NON-FED. DAMS

WEST BRANCH DAM - CT00101

WEST BRANCH OF NAUGATUCK RIVER

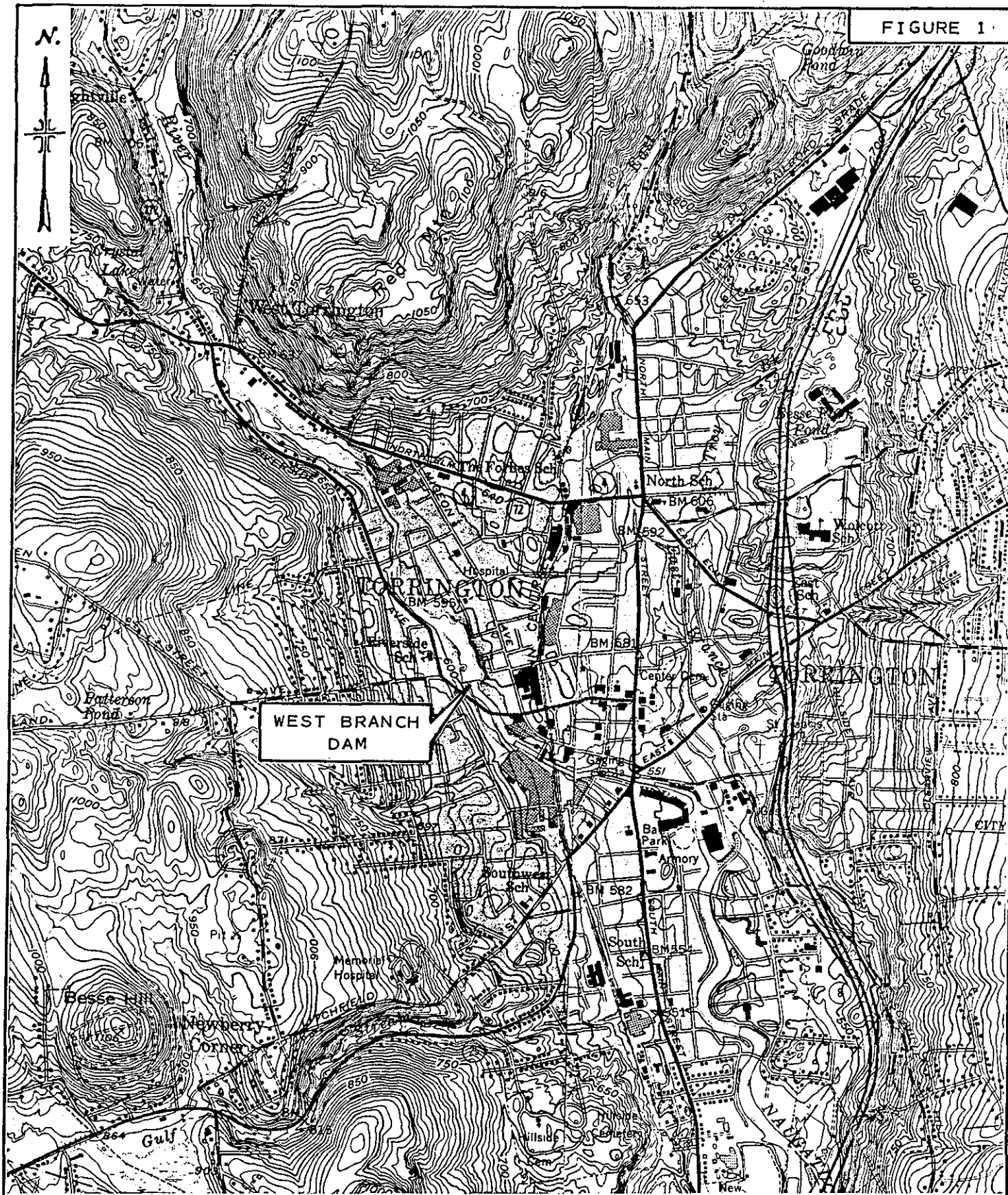
TORRINGTON, CONNECTICUT

DATE: 19 APRIL '80

dam breach. Thus the spillway capacity was added to the dam breach flow and routed downstream. The above assumption was consistent with the 1955 failure of the dam.

The peak dam breach discharge including spillway flow was calculated to be 23,500 cfs. The flood was routed to a point 1000 feet downstream of the South Main Street bridge where the flow was well within the channel limits. Beyond this point the channel increases in size. The flood was found not to overflow the channel at any of the sections. Loss of life or significant property damage from a failure of the West Branch Dam is considered unlikely. Therefore, the dam is classified as "Low" potential hazard. See Appendix C for Calculations and Plan showing Limits of Potential Flooding.





## LOCATION PLAN

WEST BRANCH DAM  
TORRINGTON, CONNECTICUT

SCALE: 1" = 2000'

ROALD HAESTAD, INC.

WEST TORRINGTON QUADRANGLE 1972

Appendix A  
Engineering Data

## LIST OF REFERENCES

Reference Nos. 1 through 4 are located at The Anaconda American Brass Company, Waterbury Office, 414 Meadow Street, Waterbury, Connecticut.

Reference No. 5 is located at the Department of Environmental Protection, Office of the Superintendent of Dams, State Office Building, Hartford, Connecticut.

- 1) Plans, "Church Street Dam, Coe Brass Branch, Torrington, Connecticut", The American Brass Company, Mechanical Department, Waterbury, 1920.
- 2) "Plan Showing Church Street Dam Area After Flood of August 19, 1955, Torrington Division, Torrington, Connecticut", The American Brass Company, Engineering Department, Waterbury, Connecticut, September, 1955.
- 3) Plans, "Proposed Replacement of East Portion of Church Street Dam, Torrington Division, Torrington, Connecticut", The American Brass Company, Engineering Department, September, 1955.
- 4) Miscellaneous Plans of Dam
- 5) Miscellaneous correspondence concerning failure of dam during 1955 Flood and subsequent repairs.

## Appendix B

### Photographs

Note: For Photo Locations,  
See Figure 2, Appendix A



PHOTO NO. 1

SPILLWAY AND RIGHT TRAINING WALL\*

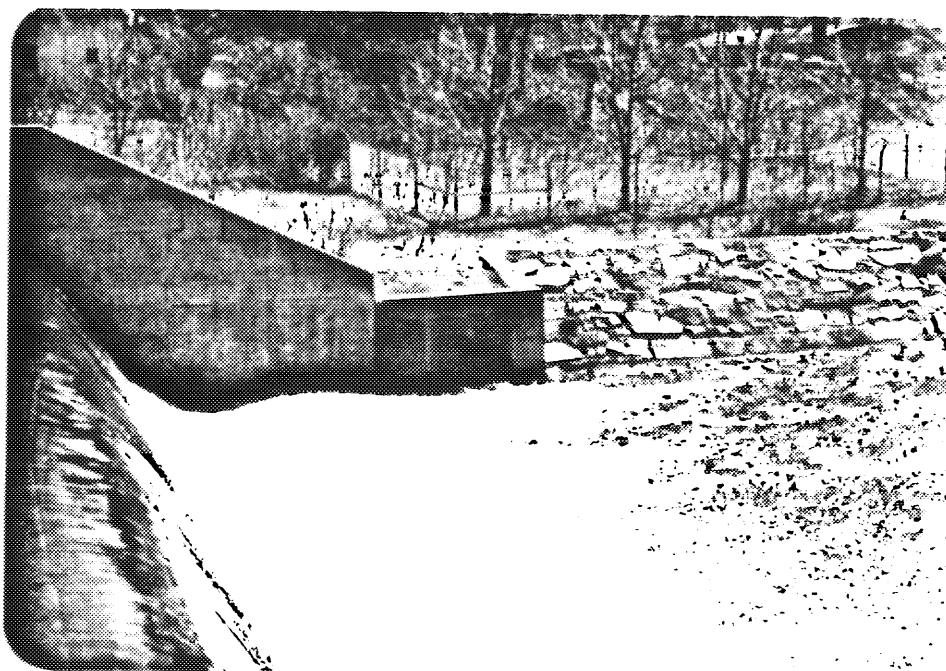


PHOTO NO. 2

LEFT TRAINING WALL AND OUTLET FROM BLOWOFF

\*5 APRIL '80

U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	WEST BRANCH DAM W. BRANCH OF NAUG. RIV. TORRINGTON, CONNECTICUT CT 00101 19 APRIL '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		



PHOTO NO. 3

DOWNSTREAM SLOPE OF DIKE  
BETWEEN CANAL AND RIVER CHANNEL

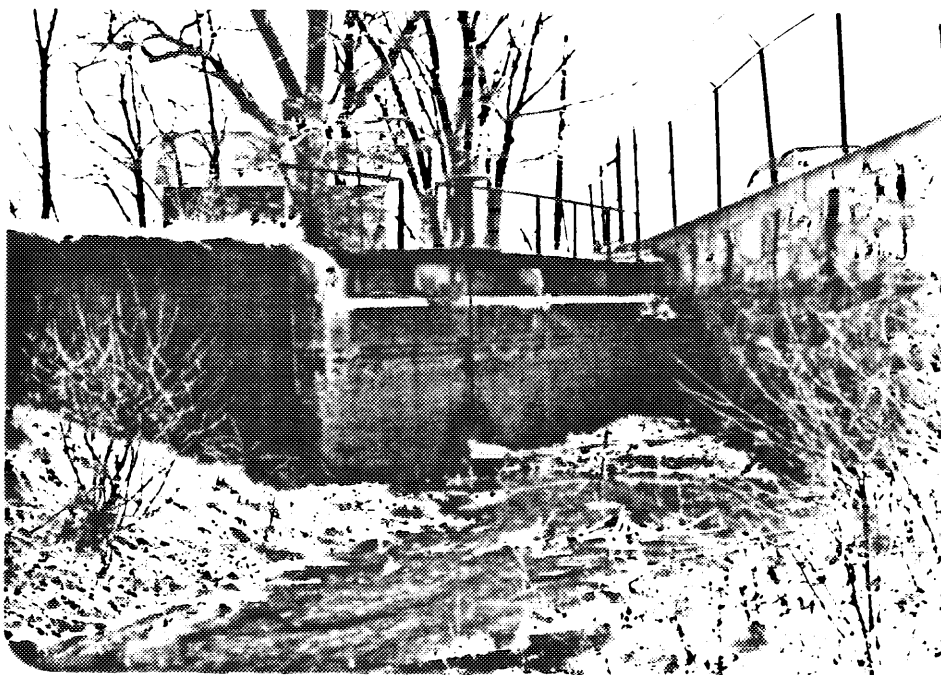


PHOTO NO. 4

OVERFLOW SPILLWAY AND OUTLET GATE  
AT END OF CANAL.

U.S. ARMY ENGINEER DIV. NEW ENGLAND  
CORPS OF ENGINEERS  
WALTHAM, MASSACHUSETTS

ROALD HAESTAD, INC.  
CONSULTING ENGINEERS  
WATERBURY, CONNECTICUT

NATIONAL PROGRAM OF  
INSPECTION OF  
NON-FED. DAMS

WEST BRANCH DAM  
W. BRANCH OF NAUG. RIV.  
TORRINGTON, CONNECTICUT

CT 00101

19 APRIL '80

Appendix C  
Hydraulic/Hydrologic Computations

BY...SAL.....DATE..4/28/80.. ROALD HAESTAD, INC. SHEET NO.....1.....OF...14.....  
CONSULTING ENGINEERS  
CKD BY...DLS...DATE...5/12/80... 37 Brookside Road - Waterbury, Conn. 06708 JOB NO...049-18.....  
SUBJECT...WEST...BRANCH...DAM...Dam...branch...Calculations.....

$S = \text{Storage at time of failure} = \text{Storage at spillway level} + \text{Storage of freeboard}$

$$S = [5.5 \text{ acres} \times 5 \text{ ft}] + [5.5 \text{ acres} \times 8 \text{ ft}] \quad \text{ESTIMATE AVERAGE DEPTH} = 5'$$

$$S = 71.5 \text{ use } 72 \text{ ac-ft}$$

$$\text{FREEBOARD} = 8'$$

$$Q_{p1} = \text{Peak Failure Outflow} = \frac{8}{27} W_b \sqrt{g} Y_0^{3/2}$$

$$W_b = \text{Breach Width} = 40\% \text{ of dam length across river at mid height} = 0.4(220) = 88 \text{ ft}$$

$$Y_0 = \text{Total height from river bed to pool level at time of failure} = 22 \text{ ft}$$

$$Q_{p1} = \frac{8}{27} (88) (\sqrt{32.2}) (22)^{3/2} = 15,268 \text{ use } 15,270 \text{ cfs}$$

In the 1955 flood the West Branch Dam failed. The failure occurred at the embankments and the spillway was left intact. Therefore a similar failure was assumed and 100% of the spillway discharge at time of failure is added to the Peak Failure Outflow to determine the total discharge.

$$\text{Spillway Discharge at time of failure} = CLH^{3/2}$$

$$C = 3.4 \quad L = 107' \quad H = 8'$$

$$Q_{\text{peak}} = 3.4(107)(8)^{3/2} = 8,232 \text{ use } 8,230 \text{ cfs}$$

$$\text{Total Discharge} = Q_{p1} + Q_{\text{peak}}$$

$$= 15,270 \text{ cfs} + 8,230 \text{ cfs} = 23,500 \text{ cfs}$$



BY SAL DATE 5/9/80

ROALD HAESTAD, INC.

SHEET NO 2 OF 14CKD BY DLS DATE 6/5/80CONSULTING ENGINEERS JOB NO 49-018SUBJECT WEST BRANCH DAM - Flood Routing

## SECTION NUMBER 1A

(MAIN CHANNEL)

H	W	A	R	S	V	Q
1.0	44	22	.50	.0110	3.49	76
2.0	80	87	1.09	.0110	5.88	510
3.0	83	167	2.01	.0110	8.86	1478
4.0	86	249	2.88	.0110	11.27	2809
5.0	90	334	3.72	.0110	13.35	4454
6.0	93	420	4.51	.0110	15.20	6384
7.0	96	509	5.28	.0110	16.87	8580
8.0	100	599	6.01	.0110	18.40	11025
9.0	103	692	6.72	.0110	19.81	13711
10.0	106	787	7.40	.0110	21.13	16629
11.0	110	884	8.06	.0110	22.37	19773
12.0	112	983	8.75	.0110	23.63	23217
13.0	114	1082	9.46	.0110	24.90	26927
14.0	116	1181	10.15	.0110	26.09	30802

MANNING COEFFICIENT=N=.0280

BY SAL DATE 5/9/80

ROALD HAESTAD, INC.

SHEET NO 3 OF 14CKD BY DLS DATE 6/5/80

CONSULTING ENGINEERS

JOB NO 49-018SUBJECT WEST BRANCH DAM-Flood RoutingSECTION NUMBER 1B

(RIGHT OVERBANK)

<u>H</u>	<u>W</u>	<u>A</u>	<u>R</u>	<u>S</u>	<u>V</u>	<u>Q</u>
12.0	25	6	.24	.0110	3.81	23
13.0	75	55	.73	.0110	7.93	435
14.0	83	134	1.60	.0110	13.35	1787

MANNING COEFFICIENT=N=.0160

BY SAL DATE 5/9/80

ROALD HAESTAD, INC.

SHEET NO 4 OF 14CKD BY DLS DATE 6/5/80

CONSULTING ENGINEERS

JOB NO 49-018SUBJECT WEST BRANCH DAM - Flood RoutingSECTION NUMBER 1

(TOTAL SECTION)

AREA				DISCHARGE		
H	A	B	TOTAL	A	B	TOTAL
1.0	22	0	22	76	0	76
2.0	87	0	87	510	0	510
3.0	167	0	167	1478	0	1478
4.0	249	0	249	2809	0	2809
5.0	334	0	334	4454	0	4454
6.0	420	0	420	6384	0	6384
7.0	509	0	509	8580	0	8580
8.0	599	0	599	11025	0	11025
9.0	692	0	692	13711	0	13711
10.0	787	0	787	16629	0	16629
11.0	884	0	884	19773	0	19773
12.0	983	6	989	23217	23	23240
13.0	1082	55	1136	26927	435	27362
14.0	1181	134	1314	30802	1787	32588

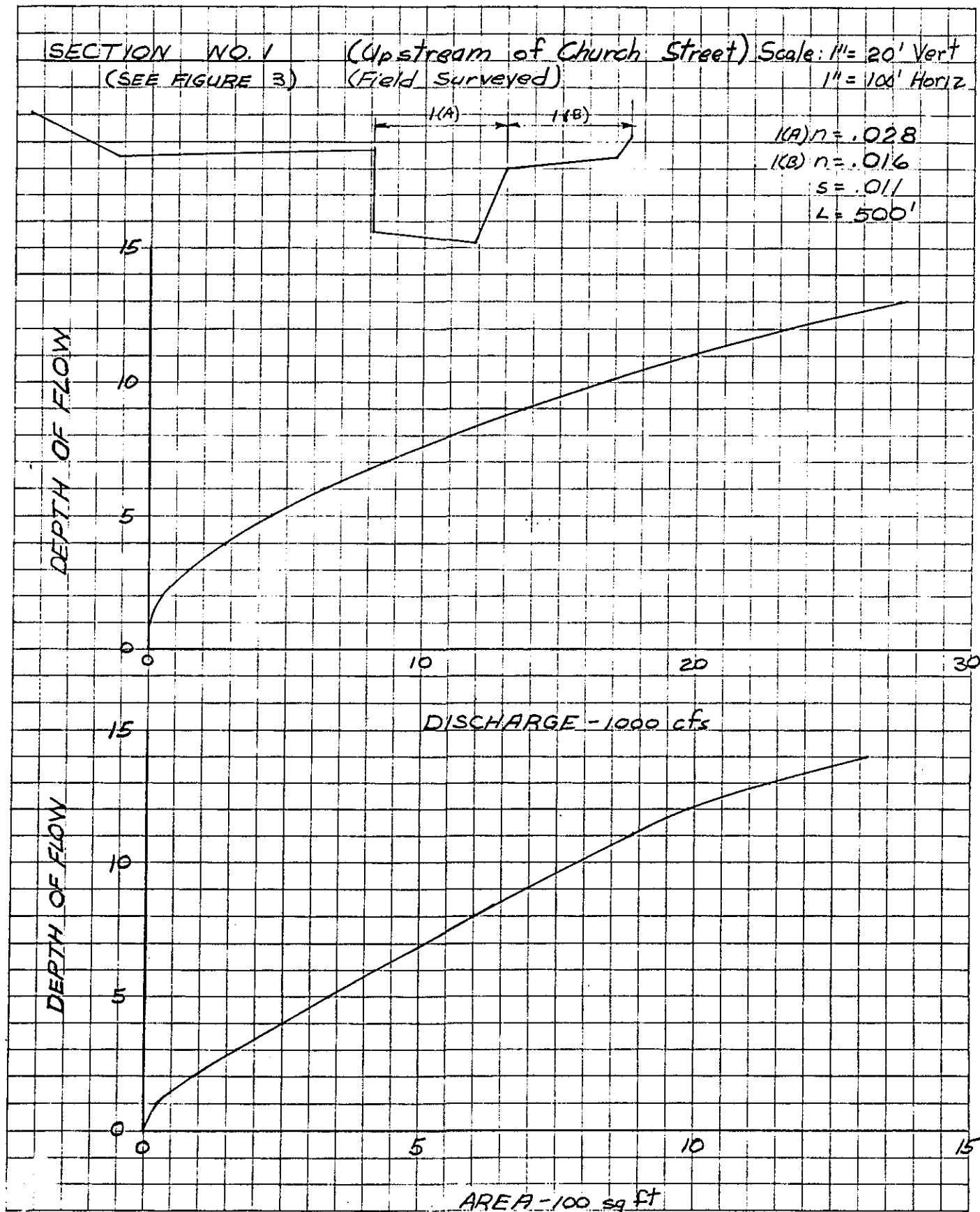
STORAGE AT TIME OF FAILURE=S= 72 AC. FT.  
 LENGHT OF REACH=L= 500 FT.

INFLOW INTO REACH=QP1=23500 CFS  
 DEPTH OF FLOW=H1= 12.1 FT.  
 CROSS SECTIONAL AREA=A1= 997 SQ. FT.  
 STORAGE IN REACH=V1= 11.4 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)=19764 CFS  
 TRIAL DEPTH OF FLOW=H(TRIAL)= 11.0 FT.  
 TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 884 SQ. FT.  
 TRIAL STORAGE IN REACH=V(TRIAL)= 10.1 AC. FT.

REACH OUTFLOW=QP2=19977 CFS  
 DEPTH OF FLOW=H2= 11.1 FT.

BY SAL.....DATE 5/9/80... **ROALD HAESTAD, INC.** SHEET NO. 5.....OF 14.....  
 CONSULTING ENGINEERS  
 CKD BY DLS DATE 6/5/80... 37 Brookside Road - Waterbury, Conn. 06708 JOB NO. 049-18.....  
 SUBJECT WEST BRANCH DAM - Flood Routing.....



BY SAL DATE 5/9/80

ROALD HAESTAD, INC.

SHEET NO 6 OF 14CKD BY DLS DATE 6/5/80

CONSULTING ENGINEERS

JOB NO 49-018SUBJECT WEST BRANCH DAM - Flood RoutingSECTION NUMBER 2

(A-SQR BRIDGE)

H	W	A	R	S	V	Q
1.0	64	59	.92	.0160	7.75	456
2.0	66	121	1.84	.0160	12.26	1482
3.0	68	183	2.70	.0160	15.84	2897
4.0	70	245	3.51	.0160	18.87	4622
5.0	72	307	4.27	.0160	21.53	6606
6.0	74	369	5.00	.0160	23.89	8815
7.0	76	431	5.69	.0160	26.03	11218
8.0	78	493	6.34	.0160	27.98	13794
9.0	80	555	6.95	.0160	29.77	16524
10.0	82	617	7.54	.0160	31.43	19391
11.0	84	679	8.10	.0160	32.97	22384
12.0	86	741	8.64	.0160	34.40	25490
13.0	88	803	9.15	.0160	35.74	28700
14.0	90	865	9.63	.0160	37.00	32004
15.0	92	927	10.10	.0160	38.18	35396
16.0	94	989	10.54	.0160	39.30	38867

MANNING COEFFICIENT=N=.0230

STORAGE AT TIME OF FAILURE=S= 72 AC. FT.

LENGHT OF REACH=L= 2000 FT.

INFLOW INTO REACH=QP1=19977 CFS

DEPTH OF FLOW=H1= 10.2 FT.

CROSS SECTIONAL AREA=A1= 629 SQ. FT.

STORAGE IN REACH=V1= 28.9 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)=11960 CFS

TRIAL DEPTH OF FLOW=H(TRIAL)= 7.3 FT.

TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 449 SQ. FT.

TRIAL STORAGE IN REACH=V(TRIAL)= 20.6 AC. FT.

REACH OUTFLOW=QP2=13107 CFS

DEPTH OF FLOW=H2= 7.7 FT.

BY SAL DATE 5/9/80

**ROALD HAESTAD, INC.**

SHEET NO 7 OF 14

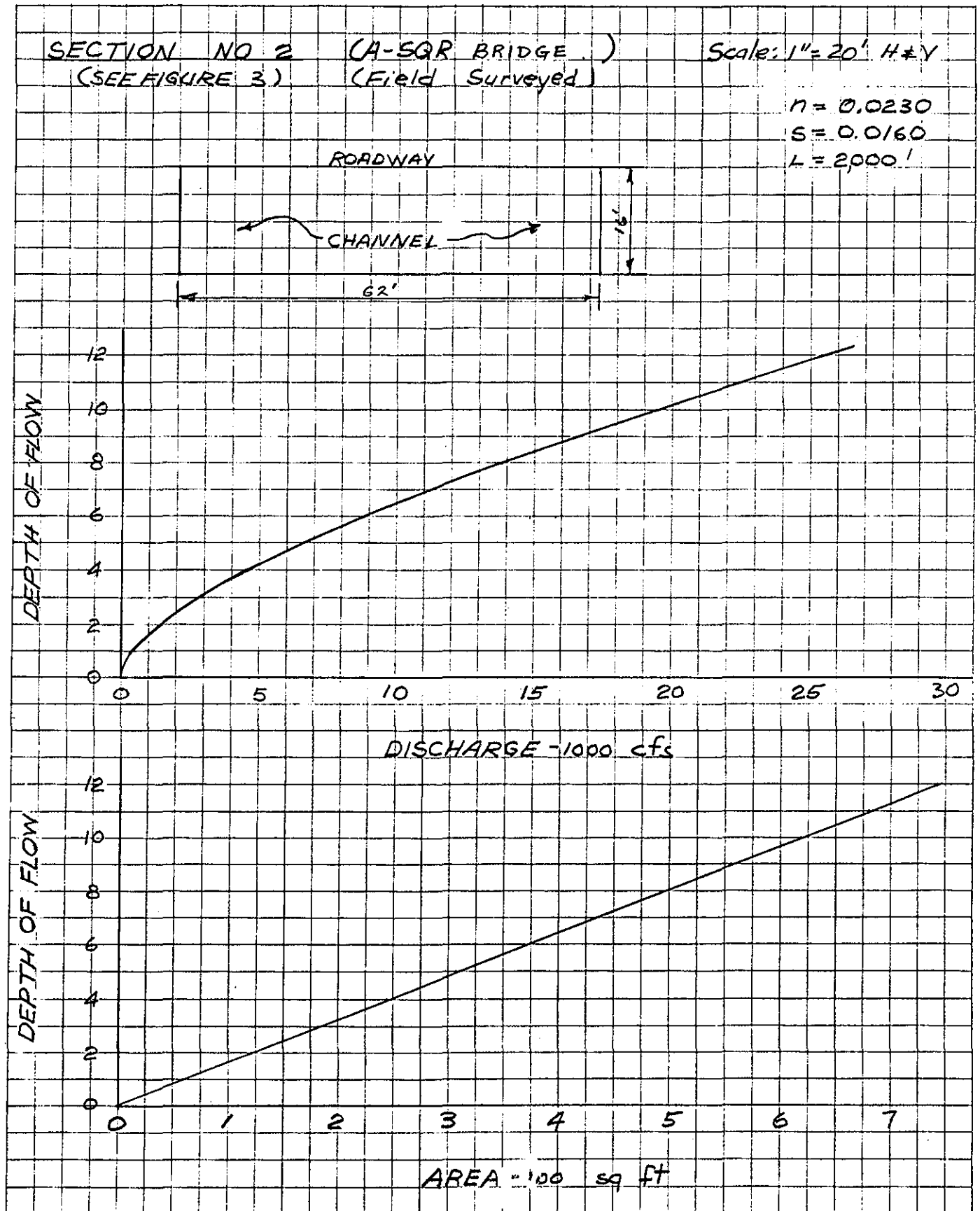
CONSULTING ENGINEERS

CKD BY RLS DATE 5/12/80

37 Brookside Road - Waterbury, Conn. 06708

JOB NO 049-18

SUBJECT WEST BRANCH DAM - Flood Routing



BY SAL DATE 5/9/80 ROALD HAESTAD, INC. SHEET NO 8 OF 14  
 CKD BY RLS DATE 6/5/80 CONSULTING ENGINEERS JOB NO 49-0/8  
 SUBJECT WEST BRANCH DAM - Flood Routing

SECTION NUMBER 3A

(MAIN CHANNEL)

H	W	A	R	S	V	Q
1.0	19	9	.47	.0100	3.48	31
2.0	37	35	.95	.0100	5.52	194
3.0	56	79	1.42	.0100	7.23	573
4.0	74	141	1.90	.0100	8.76	1233
5.0	83	217	2.62	.0100	10.86	2354
6.0	85	294	3.47	.0100	13.11	3860
7.0	87	372	4.29	.0100	15.09	5621
8.0	89	451	5.07	.0100	16.88	7606
9.0	91	529	5.83	.0100	18.50	9794
10.0	93	608	6.55	.0100	20.00	12164
11.0	95	687	7.24	.0100	21.39	14701
12.0	97	767	7.91	.0100	22.69	17393
13.0	99	846	8.55	.0100	23.90	20225
14.0	101	926	9.17	.0100	25.04	23187

MANNING COEFFICIENT=N=.0260

BY SAL DATE 5/9/80

ROALD HAESTAD, INC.

SHEET NO 9 OF 14CKD BY DLS DATE 6/5/80

CONSULTING ENGINEERS

JOB NO 49-0/8SUBJECT WEST BRANCH DAM - Flood RoutingSECTION NUMBER 3B

(LEFT OVBANK)

<u>H</u>	<u>W</u>	<u>A</u>	<u>R</u>	<u>S</u>	<u>V</u>	<u>Q</u>
12.0	39	15	.39	.0100	4.97	76
13.0	89	77	.87	.0100	8.47	656
14.0	140	189	1.35	.0100	11.37	2154

MANNING COEFFICIENT=N=.0160



BY SAL DATE 5/9/80 ROALD HAESTAD, INC. SHEET NO 10 OF 14  
 CKD BY DLS DATE 6/5/80 CONSULTING ENGINEERS JOB NO 49-018  
 SUBJECT WEST BRANCH DAM - Flood Routing

SECTION NUMBER 3

(DST OF GAGING ST)

AREA				DISCHARGE		
H	A	B	TOTAL	A	B	TOTAL
1.0	9	0	9	31	0	31
2.0	35	0	35	194	0	194
3.0	79	0	79	573	0	573
4.0	141	0	141	1233	0	1233
5.0	217	0	217	2354	0	2354
6.0	294	0	294	3860	0	3860
7.0	372	0	372	5621	0	5621
8.0	451	0	451	7606	0	7606
9.0	529	0	529	9794	0	9794
10.0	608	0	608	12164	0	12164
11.0	687	0	687	14701	0	14701
12.0	767	15	782	17393	76	17469
13.0	846	77	924	20225	656	20881
14.0	926	189	1115	23187	2154	25340

STORAGE AT TIME OF FAILURE=S= 72 AC. FT.  
 LENGHT OF REACH=L= 500 FT.

INFLOW INTO REACH=QP1=13107 CFS  
 DEPTH OF FLOW=H1= 10.4 FT.  
 CROSS SECTIONAL AREA=A1= 638 SQ. FT.  
 STORAGE IN REACH=V1= 7.3 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)=11774 CFS  
 TRIAL DEPTH OF FLOW=H(TRIAL)= 9.8 FT.  
 TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 595 SQ. FT.  
 TRIAL STORAGE IN REACH=V(TRIAL)= 6.8 AC. FT.

REACH OUTFLOW=QP2=11818 CFS  
 DEPTH OF FLOW=H2= 9.9 FT.

BY SAL DATE 5/9/80

ROALD HAESTAD, INC.

SHEET NO 11 OF 14

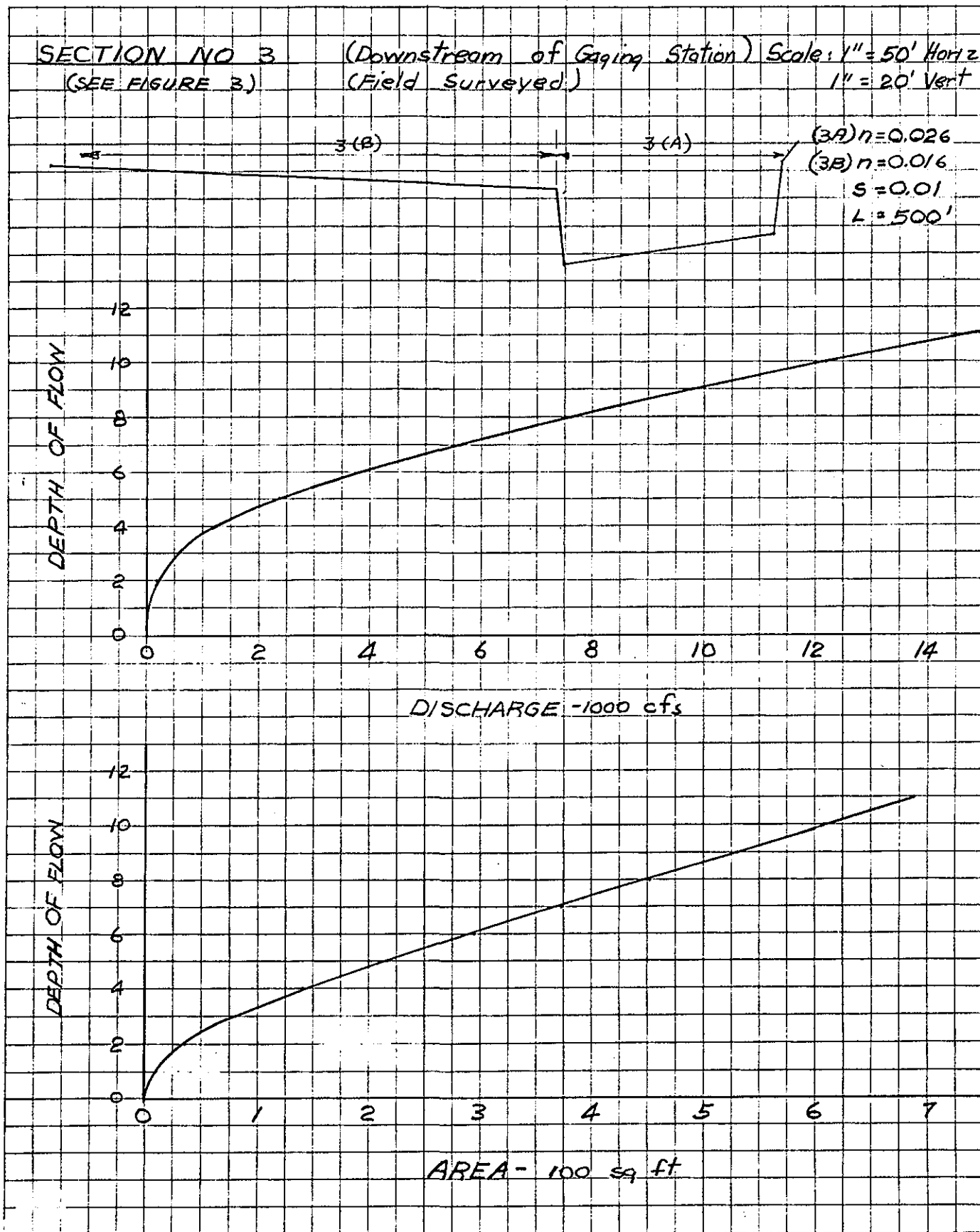
CONSULTING ENGINEERS

CKD BY DL DATE 5/12/80

37 Brookside Road - Waterbury, Conn. 06708

JOB NO 049-18

SUBJECT WEST BRANCH DAM - Flood Routing



BY SAL DATE 5/9/80

ROALD HAESTAD, INC.

SHEET NO 12 OF 14CKD BY DLS DATE 6/5/80

CONSULTING ENGINEERS

JOB NO 49-018SUBJECT WEST BRANCH DAM - Flood RoutingSECTION NUMBER 4

(TYPICAL SECTION)

H	W	A	R	S	V	Q
1.0	91	63	.69	.0080	3.14	197
2.0	96	156	1.62	.0080	5.56	869
3.0	101	254	2.51	.0080	7.45	1889
4.0	106	356	3.36	.0080	9.04	3216
5.0	110	462	4.18	.0080	10.45	4827
6.0	115	572	4.97	.0080	11.73	6711
7.0	120	687	5.73	.0080	12.89	8860
8.0	125	806	6.46	.0080	13.98	11270
9.0	130	930	7.18	.0080	14.99	13939
10.0	134	1058	7.88	.0080	15.95	16866
11.0	139	1190	8.56	.0080	16.85	20051
12.0	144	1326	9.22	.0080	17.71	23496
13.0	147	1466	9.96	.0080	18.64	27333
14.0	151	1608	10.68	.0080	19.53	31417
15.0	154	1753	11.39	.0080	20.38	35726

MANNING COEFFICIENT=N=.0330

STORAGE AT TIME OF FAILURE=S= 72 AC. FT.

LENGHT OF REACH=L= 1000 FT.

INFLOW INTO REACH=QP1=11818 CFS

DEPTH OF FLOW=H1= 8.2 FT.

CROSS SECTIONAL AREA=A1= 832 SQ. FT.

STORAGE IN REACH=V1= 19.1 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)= 8682 CFS

TRIAL DEPTH OF FLOW=H(TRIAL)= 6.9 FT.

TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 678 SQ. FT.

TRIAL STORAGE IN REACH=V(TRIAL)= 15.6 AC. FT.

REACH OUTFLOW=QP2= 8972 CFS

DEPTH OF FLOW=H2= 7.0 FT.

BY...SAL... DATE...5/9/80...

**ROALD HAESTAD, INC.**

SHEET NO...13... OF...14...

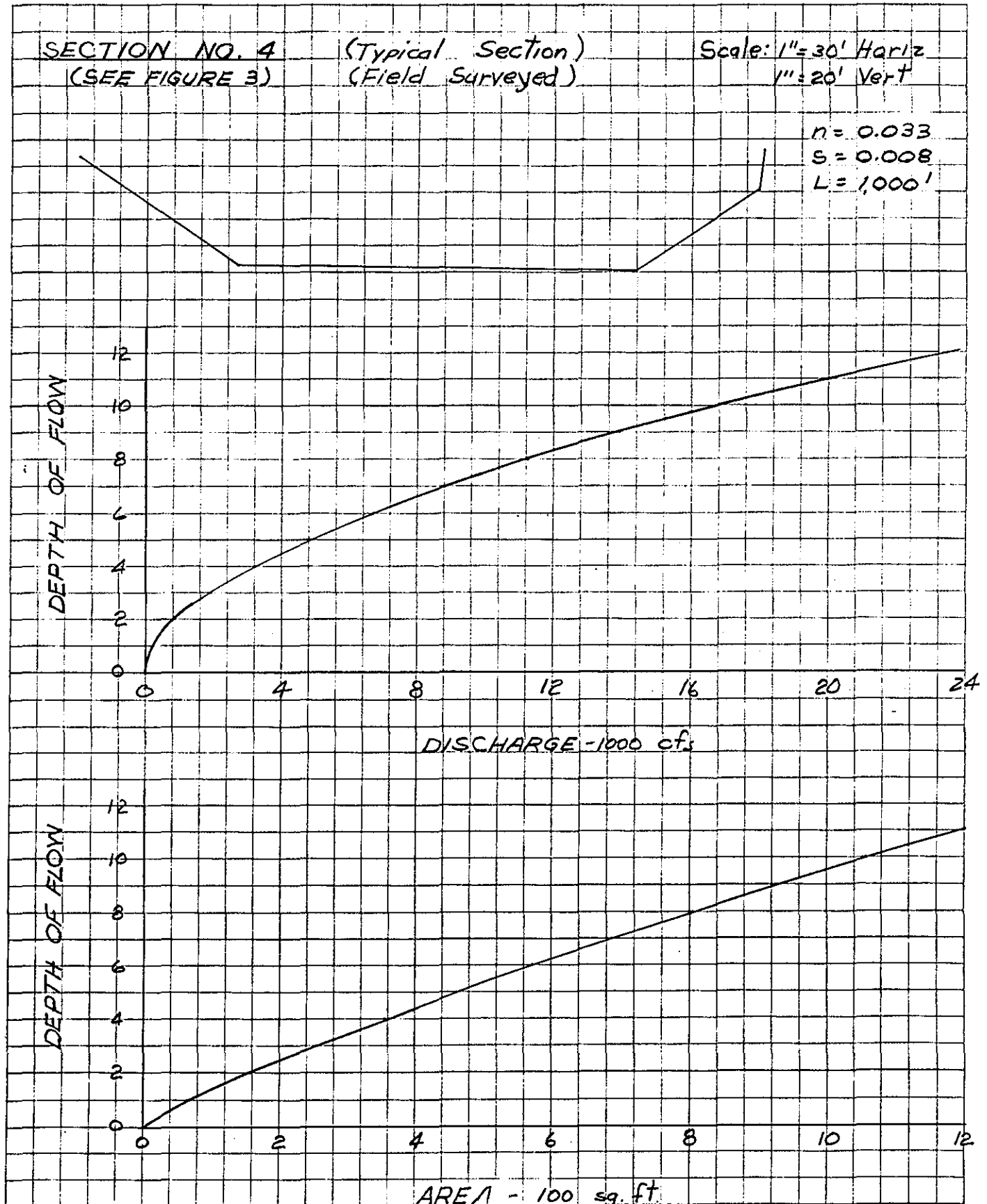
CONSULTING ENGINEERS

CKD BY...DLS... DATE...5/12/80...

37 Brookside Road - Waterbury, Conn. 06708

JOB NO...049-18...

SUBJECT...WEST BRANCH DAM - Flood Routing...



Planimeter Readings:

1) Surface Area; Third = 1.94 sq in 0.06  
First = 1.82 sq in 0.06  
Start = 1.76 sq in

$$0.06 \text{ in}^2 \times \frac{(2000 \text{ ft})^2}{\text{in}^2} \times \frac{1 \text{ acre}}{43,560 \text{ ft}^2} = 5.5 \text{ acres}$$

2) Watershed Area; Third = 10.28 sq in 2.90  
First = 4.45 sq in 2.86  
Start = 1.59 sq in

$$2.90 \text{ in}^2 \times \frac{(2000 \text{ ft})^2}{\text{in}^2} \times \frac{1 \text{ sq mi}}{(5,280 \text{ ft})^2} = 0.42 \text{ sq mi}$$

The 0.42 sq mi watershed consists of the watershed located between the Dam and Gaging Station.

The watershed for the West Branch Dam is equal to the watershed for the Gaging Station minus the 0.42 sq mi watershed.

From the 'U.S. Geological Survey Water-Data Report CT-76-1', the Gaging Station Watershed is equal to 33.7 sq. mi.

$$\text{West Branch Watershed} = 33.7 \text{ sq mi} - 0.42 \text{ sq mi} = 33.28$$

use 33.3 sq mi